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ABSTRACT

The 11 items in this annotated bibliography are entries in the ERIC system concerning the effects of school size. Research studies cited center on existing and recommended sizes for schools; relationships between the size of schools and districts and the costs of education; economies of scale; and the effects of school size on achievement, student participation, student alienation, maintenance costs, and overall educational quality. More theoretical analyses look at the importance of administrative structure and at myths purportedly surrounding rural school and district consolidation. (JM)

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THE BEST OF ERIC

ON EDUCATIONAL MANAGEMENT

Number 61, November 1981

The Best of ERIC presents annotations of ERIC literature on important topics in educational management.

The selections are intended to give educators easy access to the most significant and useful information available from ERIC. Because of space limitations, the items listed should be viewed as representative, rather than exhaustive, of literature meeting those criteria.

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ERIC Clearinghouse on Educational Management

School Size

1 **Educational Research Service.** *Summary of Research on Size of Schools and School Districts. ERS Research Brief.* Arlington, Virginia: 1974. 65 pages. ED 140 458.

What are the existing and recommended sizes for schools and school districts in the United States, and how can the shortcomings of being too small or too large be overcome? This summary of the literature on the size issue answers these questions and provides a wealth of information and recommendations that can help administrators determine optimum school and district sizes.

Existing elementary schools have an average enrollment of 401 pupils, while the average secondary school has 751 students. Urban and larger school districts, as expected, tend to have larger schools than do rural and smaller districts.

Minimum, optimum, and maximum school sizes, as recommended by researchers and practitioners, vary widely. Recommendations for elementary schools, for example, range as follows: minimum sizes—175 to 720 pupils; optimum sizes—350 to 720; and maximum sizes—350 to 1,500. Recommendations for middle, junior high, and senior high schools vary similarly.

This publication reviews seventy-five studies conducted to determine optimum senior high school size. The numerous studies are classified and discussed according to the measures of quality used, such as per-pupil expenditure, pupil achievement, curriculum offerings, special services, pupil and staff relations, and success after high school.

The inadequacies of small schools can be minimized in numerous ways. If only one teacher is available for several advanced courses, for example, "multiple classes" similar to the one-room school can be utilized. Technological advances such as programmed instruction or computer-assisted instruction might also help. Students can be enrolled in supervised correspondence courses or on-the-job training, or minicourses on specialized topics may be taught.

The primary strategy for minimizing the problems of a large school is to break the school into various "houses" or "schools-within-a-school." Included are sixteen tables and an extensive bibliography.

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2 **ERIC Clearinghouse on Educational Management.** *School Size: A Reassessment of the Small School. Research Action Brief Number 20.* Eugene, Oregon: University of Oregon, 1981. 4 pages, ED number not yet assigned.

"The optimum school size is the one that supports the kind of education the community wants at a cost it is willing to pay." This sensible conclusion contrasts sharply with the near consensus among educational policy-makers of recent decades that bigger schools are better schools.

After tracing the dramatic success of the school consolidation movement, this Research Action Brief surveys empirical evidence on school size (mostly high schools), finds most of it unreliable, and concludes that school leaders in search of the best school size should look beyond the research to the preferences of their publics.

Research supporting the arguments that larger schools are cheaper and more educationally comprehensive abounds. But much of this evidence favoring larger schools cannot withstand the stress of critical examination. Many of the studies are improperly controlled, methodologically unsound, or take too narrow a view of the size issue. For example, a positive relationship between larger size and student achievement was found by several studies, but when later studies controlled for students' intelligence or socioeconomic class, the relationship disappeared.

Despite these flaws, there is reason to conclude that "the optimum range of high schools in terms of cost effectiveness is probably in the neighborhood of 1,600 to 1,700 students, give or take a hundred." There are many local factors that must be taken into account, however, when applying this range to a particular school.

In a time when school closures elicit strong negative public feeling, school administrators should see in the school size issue an opportunity to recapture support by a public that still prefers small "neighborhood" schools. Some of the obvious limitations of small schools—such as staff inflexibility, lack of specialists, and limited resources—can be overcome by a little imagination and footwork. In terms of economy, "efficiently run small schools can cost about the same as inefficiently run large schools." In the end, school officials "need to be as concerned with parent and community perceptions of the quality of the schools as they are with such issues as comprehensiveness and costs per student."

3 **Fox, William F.** *Relationships between Size of Schools and School Districts and the Cost of Education. Technical Bulletin No. 1621.* Washington, D.C.: Economics, Statistics, and Cooperatives Service, Department of Agriculture, 1980. 33 pages. ED 187 029.

In 1930, there were 128,000 public school districts and 262,000 public elementary and secondary schools in the United States. In 1970, despite a doubling of public school enrollment, the number of districts had decreased to fewer than 17,000 and the number of

schools to less than 90,000.

The consolidation movement assumed that larger schools and districts would provide increased economy and efficiency in the delivery of education. Intensive research on the relationship between cost of education and school size, however, was not begun until the late 1950s, and this research, says Fox, has given inconsistent results. To help explain some of the inconsistencies in this research and to draw some overall conclusions from it, Fox here examines the theoretical, methodological, and empirical bases of over thirty studies on the issue of size economies in education.

"Per pupil school costs appear to be characterized by a U-shaped average cost curve," states Fox, meaning that "optimum" school sizes apparently do exist. Optimum size, however, depends on other factors, such as population density. Thus, studies conducted in rural areas found smaller optimum sizes than did studies conducted in urban areas, which found optimum high school sizes of between 1,400 and 1,800 pupils.

Numerous weaknesses exist in nearly all these studies, however, states Fox. "The theoretical underpinnings of nearly all of the interpretable studies are deficient and some may suffer from data difficulties," he states. Thus, though the existence of size economies appears certain, the weaknesses in each study "raise doubts about the exact size of any economies."

Other difficulties also exist. Many studies do not consider how other costs—such as transportation—change with school size. Size-economy "may also depend upon whether new buildings will be constructed or whether students will be redistributed among existing schools." Finally, quality of life (for example the existence of neighborhood schools) and quality of education must be considered in determining optimum school size.

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4 **Guthrie, James W.** "Organizational Scale and School Success." *Educational Evaluation and Policy Analysis,* 1, 1 (January-February 1979), pp. 17-27. EJ 207 325.

"The school consolidation movement," states Guthrie, "perhaps reflects one of the most awesome and least publicized governmental changes to occur in this nation during the twentieth century." In this excellent and well-written article, Guthrie recounts the historical development of the consolidation movement, examines closely some of the research evidence regarding school and district size, and suggests a number of strategies for future research on the size issue.

Between 1930 and 1972, the number of school districts in the nation decreased eightfold and the total number of schools decreased threefold, while the nation's school population doubled. Most of the decrease in the number of schools was due to the elimination of one-teacher schools, which Guthrie calls "the modal experience in 1930."

The justification provided by policy-makers for this grand "metamorphosis" of the nation's educational system was that larger schools would be more economically efficient and would provide better instruction than would smaller schools. Cost savings were to result from operating fewer administrative units and from purchasing supplies centrally.

Several recent studies have pointed out, however, that most scale economy studies using rural schools have failed to take transportation costs into account. Savings garnered from centralized purchasing may also be subsequently lost by increased school district distributional costs. "Evidence in favor of cost savings associated with larger size schools and school districts is, at best, ambiguous," Guthrie concludes, especially in rural areas where consolidation has been most dramatic.

For handicapped students, larger schools do appear to offer distinct advantages in the form of specialized services. But for "normal" students, Guthrie maintains, the "advantages of size so strongly proclaimed by consolidation advocates are seldom supported empirically." Again, the evidence that "bigger is better" is ambiguous. Guthrie concludes by outlining a "school scale research agenda."

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5 **Hess, Fritz; Martin, Wilfred; Parker, Donald; and Beck, Jerry.** "School Size and Its Effects on Achievement and Other Educational Issues." Chapter 1 of *Issues in Education: A Documented Look at Seven Current Topics,* compiled by Fritz Hess and others, pp. 1-21. 1978. ED 158 392.

"Is bigger really better, or do good things come in small packages?" This question has been debated for decades by educators with arguments more often than not based on intuitive speculation rather than on researched facts. But a good deal of empirical research has been conducted on the relationship of school size to academic, economic, institutional, and psychological factors. In this paper, Hess, Martin, Parker, and Beck review the methodologies and results of a large number of these studies and draw some general conclusions from them.

The preponderance of existing research has focused on "the connection, or lack of it, between school size and such academic factors as pupil achievement, success in subsequent education, and range of curriculum offerings," state the authors. Many studies found no significant relationship between school size and pupil achievement. Others, however, found that larger schools produced better results. The available research, conclude the authors, suggests that larger schools, within "reasonable upper limits," are "conducive to higher levels of pupil achievement than their smaller counterparts."

Researchers have found little relationship between school size and subsequent pupil success or failure, when differences in mental ability of students were adjusted for. Definitive relationships, however, exist between school size and range of curriculum offerings.

In economic terms, the authors state, "the bigger equals better adage has a basis in research." As with academic factors, a variety of optimum sizes have been proposed by researchers, but in general larger schools seem to be more cost efficient.

Researchers generally acknowledge that close staff-pupil relationships can be more easily achieved in smaller schools. Other researchers have demonstrated that "smaller high schools were more conducive to participating, emotionally healthy student populations."

Most existing research, the authors conclude, indicates that larger institutions, in general, are often more desirable. Efforts should be made, however, "to compensate for psychological and emotional factors in such schools."

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6 **Hickcox, Edward, and Burston, Geoffrey.** "The Question of Size." *Education Canada,* 13, 3 (September 1973), pp. 41-43. EJ 088 789.

Research has not yet revealed—nor is it likely to reveal—an "optimum" school or system size. The work done on the question of organizational size, Hickcox and Burston point out, "other than articles based on a fuzzy idealism or some sort of idealogical bias, shows, in a convincing fashion, that there is little relationship between size of system, school or class, and any productivity measures."

Some studies *do* indicate that size—"in combination with a myriad of other factors"—does have some effect on output measures. But because of the complex relationships, "no one so far has been able to isolate the effect of size in any significant way."

Hickcox and Burston believe that the central concern of adminis-

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trators should be the learning relationship between teacher and student. "The administrative structure, no matter what the size, must support that relationship," they state. Thus, educational policy-makers and administrators "should focus their energies not on how large schools should be, but on how to organize them, given a particular size."

When decisions about school or system size must be made, administrators should consider other factors besides cost and student development. Geographical factors—such as population density—should be taken into consideration. Likewise, history and tradition, as well as political considerations, may be important. But "size *per se* is not the crucial factor," the authors emphasize. "Other factors important to the learning situation have to be taken into consideration."

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7 **Huling, Leslie.** "How School Size Affects Student Participation, Alienation." *NASSP Bulletin,* 64, 438 (October 1980), pp. 13-18. EJ 232 068.

Do students in small high schools participate in extracurricular activities more than students in large high schools? Are students in small schools less "alienated"? According to Huling, educational research and literature indicate that the answer to both these questions is yes.

One researcher, for example, found that only 32 percent of the students in large (1,500 or more students) schools participated in one or more school activity, while in medium-sized schools (600-1,499 students), 76 percent participated. The reason for this difference is that smaller schools have about the same number of extracurricular activities available as do larger schools and, thus, a larger proportion of students in small schools can fill "positions of responsibility." As one researcher put it, in small schools students are "generally less expendable."

Another study discussed by Huling examined "marginal" students in different-sized schools. In small schools, marginal students "were similar to their regular schoolmates in the sense of obligation they felt toward participating in school activities." In large schools, however, marginal students, as a group, reported "little, if any, sense of obligation."

Student alienation, Huling points out, is difficult to measure precisely, but some studies shed indirect light on the relationship between school size and student alienation. In general, these studies indicate that "students in small schools are less alienated than students in large schools."

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8 **McGuffey, Carroll W., and Brown, Carvin L.** "The Relationship of School Size and Rate of School Plant Utilization to Cost Variations of Maintenance and Operation." *American Educational Research Journal,* 15, 3 (Summer 1978), pp. 373-78. EJ 189 652.

Does the per-pupil cost of maintaining and operating a school go down as school population rises? At what level of design capacity does the per-pupil cost of maintenance and operation (M&O) reach a minimum?

To find out, McGuffey and Brown tapped the computer banks of the Atlanta (Georgia) public school system, which hold data on school populations and cost of school plant operations. Altogether, they examined twenty-three high schools and thirty-three elementary schools.

Independent variables included the size of each school and the utilization rate of each school—computed by dividing the school's population by the design capacity of the school plant. The dependent variable—pupil cost for M&O—included "maintenance materials, labor, custodial supplies, custodian salaries, all utilities, and miscellaneous items normally charged to maintenance and operations fiscal accounts."

As expected, larger schools had a significantly lower per-pupil cost of M&O than did small schools. High rates of plant utilization also led to significantly lower per-pupil M&O costs. Both relationships were stronger for secondary schools than for elementary.

The lowest predicted per-pupil cost of running secondary and elementary schools in Atlanta would be achieved by operating them at 114 percent and 135 percent of their design capacities, respectively. However, schools should not necessarily be operated above 100 percent of their design, the authors warn, because their study did not consider such pertinent factors as the potential for group conflict and the violation of individual space requirements in overcrowded schools.

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9 **Ratsoy, Eugene W., and Bumbarger, Chester S.** "School Size, Cost and Quality." *Canadian Administrator,* 15, 5 (February 1976), pp. 1-5. EJ 138 044.

The "deification of bigness in education" has led to efforts to consolidate educational systems in both the United States and Canada. Because of declining enrollments, population sparsity, and geographical barriers, however, small schools will persist and may even grow more numerous in the future. In this monograph, Ratsoy and Bumbarger compare small and large schools and recommend some steps for overcoming the disadvantages of small schools.

Several studies show that "in general, the smaller the school, the less well-prepared is the staff in terms of degrees held, years of experience or certificate held." Staff members in small schools, however, take on a broader range of tasks, and teachers often teach outside their area of specialization.

The curriculum offered in larger schools, state the authors, is broader. On the other hand, a greater percentage of students in small high schools participate in extracurricular activities than do students in large schools.

Research comparing student achievement in small and large schools is conflicting, at least in part due to flawed experimental design. A recent study of schools in Saskatchewan, however, found that there were no significant relationships between performance on the Canadian Test of Basic Skills and such organizational factors as size of school, size of classroom enrollment, class and grade organization, or transportation to school.

Several studies show that small schools cost more per pupil to operate, and many states and provinces provide extra funds for small schools. Suggestions for improving small schools include the use of itinerant specialist personnel such as coaches and art and drama instructors, expansion of library resources for independent study, greater numbers of extracurricular activities, and work experience programs in cooperation with local industries.

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10 **Schneider, Barbara L.** *America's Small Schools.* University Park, New Mexico: ERIC Clearinghouse on Rural Education and Small Schools, New Mexico State University, 1980. 53 pages. ED 187 508.

"Are small schools 'better' places for educating elementary and secondary school students," Schneider asks, or have Americans simply adopted "big to small" as the latest panacea for improving education? To shed light on this question, Schneider here examines the diversity of small schools and reviews the research that identifies the strengths and weaknesses of small schools.

Small schools are usually regarded as synonymous with rural public schools, says Schneider, yet the matter is not that simple. A variety of "small" schools exist, not only in rural areas, but in urban and suburban areas as well. Publicly funded small schools include rural schools, Indian schools, schools for American dependents overseas, alternative schools, and special schools for the mentally and physically handicapped. Privately funded small schools include religious and nonreligious schools, boarding schools, and academies.

So do small schools provide a better educational experience? Unfortunately, says Schneider, the answer to that question is hard to come by. There is only a small amount of research exploring the relationship between school size, economics, and quality of education, and most of this research is inconclusive or inconsistent. Schneider reviews some of this research and concludes that before policy-makers jump on the small school bandwagon, they should carefully consider the strengths and weaknesses of small schools.

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11 **Sher, Jonathan P., and Tompkins, Rachel B.** *Economy, Efficiency, and Equality: The Myths of Rural School and District Consolidation.* Washington, D.C.: National Institute of Education, 1976. 47 pages. ED 135 507.

Rural school and district consolidation has been "the most successfully implemented educational policy of the past fifty years," state Sher and Tompkins. Although not entirely devoid of worth, the strengths of the movement have been "greatly exaggerated, its weaknesses often ignored, and its overall merits as a strategy for educational reform and improvement grievously overstated and oversold." In what is perhaps the best critical analysis of the school consolidation movement to date, Sher and Tompkins here openly attack the research evidence, the rationale, and the "myths" supporting rural school consolidation.

School consolidation has been and continues to be implemented with enthusiasm, a fact that would lead one to expect the empirical evidence supporting consolidation to be overwhelming. But it is not, state these authors. The evidence is incomplete; the research is, with rare exception, methodologically unsound; and the conclusions of the studies on consolidation are "at best, inconclusive, and, at worst, simply incorrect."

The authors question the "myth of economy" on the basis that most studies have failed to acknowledge *diseconomies* of scale—particularly in areas of transportation and purchasing—that often diminish or totally negate economies of scale. "The point is not that economies of scale are non-existent in rural education, but rather that they must be considered in conjunction with existing diseconomies."

The authors then examine the "myth of improved quality." The work of James Bryant Conant—whose 1959 study of the American high school was a powerful stimulus for consolidation—is closely examined. After using some of Conant's own data to undermine his arguments, Sher and Tompkins conclude that Conant's central conclusion is "certainly incomplete and probably incorrect." Other research evidence—including the 1966 Coleman report—is marshalled as evidence that school size is not significantly correlated with student achievement.

The authors conclude with an illuminating discussion of why the assertions of the consolidation movement went unchallenged for so long. They emphasize throughout a balanced approach to the consolidation question and the primary importance of local circumstances in determining the extent of rural consolidation.

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